Guidance for Evaluating Cooling Water Intake Structures

[Implementing Section 316(b) of the Clean Water Act and Chapter 283.31(6), Wis. Stats.]

February 22, 2005

This document is intended solely as guidance, and does not contain any mandatory requirements except where requirements found in statute or administrative rule are referenced. This guidance does not establish or affect legal rights or obligations, and is not finally determinative of any of the issues addressed. This guidance does not create any rights enforceable by any party in litigation with the State of Wisconsin or the Department of Natural Resources. Any regulatory decisions made by the Department of Natural Resources in any matter addressed by this guidance will be made by applying the governing statutes and administrative rules to the relevant facts.

Introduction

Section 316(b) of the Clean Water Act requires, and Chapter 283.31(6), Wis. Stats., allows the Department to require that the location, design, construction, and capacity of cooling water intake structures (CWIS) reflect the best technology available (BTA) for minimizing adverse environmental impact. This guidance is intended to describe the information needed in order for the Department to evaluate the potential impacts of CWIS on their aquatic environment and to allow for the Department's determination of whether BTA is being used (or proposed) to minimize adverse environmental impacts. Although this guidance provides general guidelines to follow, WPDES permits staff, in collaboration with water quality and fisheries biologists, will need to make BTA decisions based upon specific analyses of individual sites.

EPA originally issued regulations to implement Section 316(b) of the Clean Water Act in 1976. Soon after, the U.S. Court of Appeals vacated the EPA rules, saying that the Agency had failed to comply with the publication provisions of the Administrative Procedure Act. EPA never proposed or promulgated revisions to this original regulation. Because of this, determinations of BTA for CWIS technologies have generally been governed by draft federal guidance ever since, and each state has had substantial discretion to determine what control requirements would satisfy the BTA criterion. For the most part, regulators have decided on a case-by-case basis whether CWIS technologies constitute BTA. Following an initial burst of activity in the mid 70's and early 80s, EPA has paid little attention to CWIS. In 1993, various environmental groups brought suit against EPA to compel the Agency to implement the requirements of s. 316(b). In order to settle the litigation, EPA entered into a consent decree in 1995 that required new regulations to implement s. 316(b) according to the following schedule:

Timeline For New 316(b) Regulations

- **Phase I (completed):** New facilities - final rules published December 2001
- **Phase II (completed):** Existing power generators withdrawing ≥50 MGD - final rules July 2004
- **Phase III (under development):** Manufacturing facilities, including: chemical mfg.; refineries; pulp & paper; steel, aluminum, copper and iron mfg. (proposed November '04; final by June '06)

The Department's authority to regulate CWIS is directly tied to the issuance of a Wisconsin Pollutant Discharge Elimination System (WPDES) permit and can be found in Wis. Stats. Chapter 283.31(6):

> *"Any permit issued by the department under this chapter which by its terms limits the discharge of one or more pollutants into the waters of the state may require that the location, design, construction and capacity of water intake structures reflect the best technology available for minimizing adverse environmental impact."*

Since the mid 70's, the Department has used EPA guidance and best professional judgment to determine, on a case-by-case basis, whether CWIS technologies used by individual facilities constitute BTA. In order to make initial BTA determinations in the 1970's, power plants with a WPDES permit were required to provide site-specific information to estimate the number and weight of fish impinged or entrained by their CWIS.

General guidance is provided in this document, outlining the development, conduct, and review of studies designed to determine and evaluate the potential for adverse environmental impact from a CWIS. This document is intended for use by Department staff who will need to decide whether the proposed (or existing) design, location, construction, and capacity of a CWIS reflects BTA, and permittees who will have to provide the information needed to make these decisions. Staff should remember that environment-intake interactions are highly site-specific, and therefore BTA decisions should be made on a case-by-case basis. When deciding what is needed to evaluate an existing intake, data requirements should be based on the determination of the potential for adverse impact and the availability of relevant historical data. In limited instances, existing plants may have enough relevant historical data to make further studies unnecessary. Conversely, the process for evaluating new intakes and most existing intakes will probably be more extensive because of a lack of relevant historical data (because there is no historical data or because of significant changes in the environment since data was collected).

Potential Impacts Of Cooling Water Intake Structures

In s. 316(b), a cooling water intake structure (CWIS) is defined as the total physical structure and any associated constructed waterways used to direct water into the cooling system, where a major portion of the water is used for cooling. The CWIS extends from the point at which water is withdrawn, up to and including the intake pumps. A CWIS can cause adverse environmental impact by pulling large numbers of fish, shellfish, and other organisms and their eggs and larvae into a facility's cooling system. There, the organisms may be killed or injured by heat, physical stress, or chemicals used within the system. Larger organisms may be killed or injured when they are trapped against screens at the front of the intake structure. Indirect impacts are also possible, such as disruption of thermal regimes, disruption of normal water flow, wetland or other upland disturbance, aesthetics, and/or noise.

The primary goal of s. 316(b) is to minimize impingement mortality and entrainment (IM&E) of organisms in the area around a CWIS. Impingement (or entrapment) is the blocking of larger organisms by some type of physical barrier. For example, most CWIS include screening equipment (usually 3/8" mesh) installed in the cooling water flow to protect downstream equipment such as pumps and condensers from damage or clogging. Larger organisms, such as fish which enter the system and cannot pass through the screens, are trapped ahead of them. Eventually, if a fish cannot escape or is not removed, it will tire and become impinged on the screens. If impingement continues for long, the fish may suffocate when water currents prevent it's gill covers from opening. If the fish is impinged for a short period and removed, it may survive. However, it may lose its protective slime and/or scales through contact with screen surfaces or from the high pressure water jets designed to remove debris from the screens. Delayed mortality following impingement may approach 100 percent. For some species of fish, the intake may represent a double jeopardy situation where the same population will be subject to increased mortality through entrainment of eggs and larvae and additional mortality to juveniles and adults through impingement. Section 316(b) performance standards apply to impingement mortality, allowing for the estimation of how many fish that are entrapped become free and survive.

Entrainment is the taking in of organisms with the cooling water. The organisms involved are generally of smaller size and may include fish eggs and larvae, shellfish larvae, and other organisms. As these entrained organisms pass through the system, they can be subjected to stressors such as mechanical damage due to contact with internal surfaces of pumps, pipes, and condensers; pressure damage due to passage through pumps; shear damage due to complex water flows; thermal damage due to elevated water temperatures; and toxicity due to the addition of chemicals to prevent condenser fouling and corrosion. Those organisms that do survive passage through the system may then experience delayed mortality after being returned to the receiving water. Section 316(b) performance standards do not allow for any predicted survival of entrained organisms, instead automatically assuming that all organisms that are entrained are lost.

CWIS regulations do not specifically identify methods to reduce IM&E in each situation. Instead, these rules set basic performance standards and allow permittees and Department staff to decide what is BTA for each site-specific situation. Examples of existing technologies in use to reduce IM&E include fish diversion or avoidance systems designed to divert fish away from intakes; passive intake systems such as non-mechanical screens; mechanical screen systems that prevent organisms from entering the intake system; and fish return systems that transport live organisms away from the intake system.

Federal 316(b) Regulations

Power plants are the largest users of cooling water in most cases and, to date, federal regulations have been directed primarily at this category (see: http://www.epa.gov/ost/316b/). In December 2001, EPA published a final rule implementing section 316(b) that applies to new power generating and manufacturing facilities; final rules for existing power generating facilities were completed on July 9, 2004. EPA proposed regulations covering existing manufacturing facilities on November 24, 2004. These facilities will need to show that their CWIS meet BTA standards in the near future.

Phase I: New Facilities (40 CFR Part 125.83)**.** On December 18, 2001, EPA published a final 316(b) rule that applies to new power plants and manufacturing facilities that withdraw water for cooling purposes. This rule for new facilities is referred to as "Phase I". According to this rule, a new facility is any "greenfield" or "stand-alone" facility that started construction after January 2002, has a design intake flow > 2 MGD, and uses at least 25% of the water withdrawn for cooling purposes. A greenfield facility is constructed at a site where no other source is located, or totally replaces the process or production equipment at an existing facility. A stand-alone facility is a new, separate facility constructed on property where an existing facility is located, with processes substantially independent of the existing facility at the same site (see 40 CFR Part 125.83).

The Phase I rule establishes BTA, based on a two-track approach, for minimizing adverse environmental impact associated with the use of a CWIS. Track I requires the permittee to select and implement closed-cycle cooling systems (cooling towers) that minimize IM&E, based on the assumption that these systems cut cooling water usage by 75-95% compared to once-through systems, thereby reducing IM&E and other impacts accordingly.

Track I Requirements:

- Use closed-cycle recirculating cooling water system
- Through-screen intake velocity $\leq$ 0.5 fps
- Use $\leq$ 5% mean annual flow for river intakes
- No disruption of natural thermal stratification for lake intakes

Track II allows permittees to conduct site-specific studies that demonstrate alternative measures to reduce IM&E to a level of reduction comparable to that required by Track I. Phase I also allows permittees to demonstrate that compliance costs associated with Tracks I and II would be unreasonable; or that air quality impacts, energy generation impacts ("energy penalties"), or other impacts not related to IM&E, could outweigh the additional IM&E effects and therefore justify an open loop system.

Phase II: Existing Power Plants (40 CFR Part 125.93)**.** On July 9, 2004, EPA published a final 316(b) rule that applies to certain existing power plants. This rule is referred to as "Phase II". The Phase II rule establishes requirements applicable to the location, design, and capacity of CWIS at existing facilities that withdraw more than 50 MGD. An "existing facility" is one that commenced construction on or before January 17, 2002, and any modification of or addition to such a facility that does not meet the definition of a new facility at 40 CFR, Part 125.83. According to the Phase II rule (40 CFR 125.94), an existing facility must meet one of the following:

1) Demonstrate that technology in use reduces intake capacity to a level commensurate with that of a closed-cycle, recirculating cooling system. (applies to all waterbody types)

2) Implement design & construction technologies, operational measures, and/or restoration measures that meet specified performance standards compared to the calculation baseline (see definition below):

   a) For facilities with CWIS on a freshwater river or stream:
      i) If intake flow is <5% of annual mean flow, reduce impingement mortality by 80-95%;
      ii) If intake flow is $\geq$5% of annual mean flow, reduce impingement mortality 80-95% & entrainment 60-90%.

   b) For facilities with CWIS on a lake or reservoir other than the Great Lakes:
      i) Reduce impingement mortality by 80-95%, no disruption of the natural thermal stratification or turnover pattern of the source water, if the intake capacity is increased.

   c) For facilities with CWIS on a Great Lake:
      i) Reduce impingement mortality by 80-95% and entrainment by 60-90%.

3) Demonstrate that the facility qualifies for a site-specific determination of BTA because its costs of compliance would be significantly greater than the environmental benefits of compliance with the performance standards.

4) Installation of submerged cylindrical wedgewire screen technology, if the intake meets certain requirements in 40 CFR Part 125.99.

The calculation baseline to be used when evaluating attainment of the performance standards is the IM&E that would occur with a shoreline intake, once-through cooling, and minimal IM&E controls (see 40 CFR 125.93).

Phase III: Existing Manufacturing Facilities (40 CFR Part 125.100)**.** EPA proposed regulations on November 24, 2004, that apply to existing manufacturing facilities. In these rules, it is recommended that existing manufacturing facilities meet similar information submittal and performance standard requirements as those for existing power plants (see Phase II, above). Final Phase III regulations are expected in June 2006. (**A final decision has not been made regarding which size manufacturing facilities must comply with Phase III. In the proposed rule, EPA suggests 3 alternate "cut-offs" to define which will have to comply: dischargers that withdraw 1) ≥ 50 MGD, 2) ≥ 200 MGD, or 3) ≥ 100 MGD and withdraw waters from a Great Lake.*)

Where Does CWIS Review Fit Into the Permitting Process?

Recent and future rule revisions at the federal level will mean that the Department must re-evaluate each CWIS at permit reissuance. Permittees with a CWIS will have to demonstrate whether they meet BTA requirements described in s. 316(b) each time that they submit a WPDES permit application. (An initial demonstration must be made during the first application period; subsequent applications will likely require less intensive verification and/or adaptive management demonstrations.) When a new power plant has been proposed, WPDES permits staff will be expected to work closely with the Department's Project Manager and Regional Coordinator to ensure that permitting and review activities are integrated into the process mandated by the Power Plant Siting Law (See Appendix 1). When a CWIS review is needed for an existing power plant or other facility, permits staff, basin engineers, fisheries staff, and the CWIS coordinator should work together to ensure that CWIS review activities are integrated into the permit process.

Staff in the Bureau of Watershed Management's WW Permits & Pretreatment Section are responsible for permit reissuance activities for all Phase I & II facilities, and therefore will be primarily responsible for coordinating the 316(b) review and approval process. They will be responsible for determining if other staff should be consulted (e.g., regional WPDES permits & compliance staff; Chapter 30, fisheries, the CWIS coordinator; etc.) in order to make the best decisions regarding whether the location, design, construction, and capacity of an existing or proposed CWIS reflects BTA. Specific activities that are the responsibility of the permit coordinator may include:

- overall project (permit) coordination
- review of plans & study results
- drafting portions of an Environmental Assessment (EA) or Environmental Impact Statement (EIS) (as needed)
- review of permit monitoring data
- determination of compliance with performance standards
- main point of contact for Environmental Analysis and Liaison Section, Public Service Commission, region/central office staff, and other programs
- attend meetings with permittee, as needed, to discuss performance standards and CWIS technologies

The CWIS coordinator, (currently Kari Fleming, in the Bureau of Watershed Management's Water Quality Standards Section) is responsible for the development and maintenance of 316(b)-related guidance, standard permit language, and other support materials, and statewide implementation of the program. This position may also contribute expertise and assist in making BTA determinations for individual facilities, as needed. Specific activities that are the responsibility of the CWIS coordinator may include:

- maintaining CWIS guidance (this document) & standard permit language
- providing "expertise" in difficult or complex situations
- providing statewide perspective and checks for consistency
- assist permit coordinator with EA and EIS language (as needed)
- assist in the review of plans & study results
- attend meetings with permittee, as needed, to provide advice and expertise regarding performance standards and CWIS technologies

The permittee is responsible for providing the information needed to determine whether the CWIS will meet BTA standards. Once this information is made available, the Department will determine which s. 316(b) performance standards apply and then review and approve plans, biological studies, source water information, and technologies needed to meet BTA criteria. Once the Department has determined whether the proposed (or existing) CWIS will meet applicable performance standards, the WPDES permit should be reissued with requirements that are necessary to attain and demonstrate compliance with those standards.

316(b) Information Submittals

In order to demonstrate BTA, certain information must be submitted for Department approval. Information submittal requirements for Phase I new facilities are described at 40 CFR Part 125.86. Information needed to meet Phase II requirements are described at 40 CFR Part 125.95 and summarized below. More detailed information in the federal regulations can be found at: http://www.epa.gov/ost/316b/. Cooperation and open communication between the permittee and the Department during plan development and implementation is essential and ensures that everyone is in agreement as to the scope and details of work to be planned and completed.

The Comprehensive Demonstration Study

The purpose of the Comprehensive Demonstration Study (CDS), required in 40 CFR 125.95(b), is to characterize IM&E, to describe CWIS operations, and to confirm that the technological, operational, and/or restoration measures selected reflect BTA for minimizing adverse environmental impact. The final CDS report should specify which compliance alternative(s) are planned to meet BTA standards. Facilities that intend to meet BTA by reducing flow commensurate with a closed-cycle, recirculating system are not required to submit a CDS. Facilities that intend to meet BTA by reducing their design intake through-screen velocity to ≤0.5 fps are required to submit a CDS only for the entrainment requirements, if applicable. Facilities that have a capacity utilization rate <15%, or that withdraw <5% of the mean annual flow of a river, or that withdraw cooling water from a lake or reservoir (other than a Great Lake), are required to submit a CDS only for the impingement mortality requirements. Facilities that intend to meet BTA by installing a pre-approved technology (wedge-wire screens) need to submit only the Technology Installation and Operation Plan and the Verification Monitoring Plan appropriate to the pre-approved technology. (See federal regulations at: http://www.epa.gov/ost/316b/ for details.)

Suggested Timelines. As noted above, facilities must comply with 316(b) submittal requirements with their permit application. However, 40 CFR 125.95(a) allows facilities with permits that expire before July 7, 2008, to request an extension for submission of application materials that is as expeditious as practicable but no later than January 7, 2008. (This is the latest allowed; staff should use their experience to decide how long is needed.) The following is an example schedule proposed by power generators, which takes advantage of the entire extension:

Task	Approximate Time Allowed	Suggested Due Date
Prepare RFP and select contractor	---	10/30/04
Prepare and submit PIC	8 weeks	12/31/04
State Review of PIC and Address Comments	~75 days	3/15/05[2]
Complete baseline IM&E sampling	1 year[1]	3/31/06
Analyze IM&E data, make decisions on compliance *(assumes May-Sep sampling)*	3 months	6/30/06[2]
Engage in site-specific studies appropriate to support compliance approach	1 year	6/30/07
Prepare and submit final CDS report	7 months	1/7/08[3]

[1] based on augmenting sampling database from previous studies, which was shown to still be relevant

[2] Frequent communication between the permittee and the DNR is essential; it is recommended that regular meetings and./or conversations occur at major milestones throughout the process (e.g., at the end of the 2005 summer sampling periods, mid-way through the 2006 planning period, etc.) to ensure that all agree as to the scope and details of work planned and completed.

[3] this is the final date allowed by the Phase II regulations and it cannot be extended.

The following is a summary of the information that should be included in a final CDS report, depending upon the compliance alternative selected. An example CDS report format is given in Appendix 2.

1) Proposal for Information Collection (PIC)

The permittee must, under the federal regulation, submit a proposal to the Department describing how it intends to demonstrate that the proposed (or existing) CWIS will meet BTA standards. This proposal should, to the maximum extent possible, be reviewed by staff who should then provide comments to the permittee in a timely manner. Information needed in the PIC is described at 40 CFR 125.95(b)(1). The collection and analysis of information will be an iterative process and plans for information collection may change as new data needs are identified. While the PIC is only submitted once, the permittee should consult with the Department as appropriate after the PIC has been submitted, in order to ensure that the Department will have all of the information necessary to make decisions. Example PIC outlines are shown in Appendix 2.

2) Source Waterbody Flow Information

Source waterbody flow information is used to determine which performance standards apply. For rivers/streams, flow data is required (USGS, ACOE, or other validated flow data may be acceptable); for lakes/reservoirs, thermal stratification must be characterized. The appropriate information to be submitted is described in 40 CFR 125.95(b)(2). At a minimum, the following information should be provided:

a) A narrative description & scaled drawings showing the physical configuration of all source waterbodies used by the facility, including areal dimensions, depths, temperature regimes, and other documentation that supports the determination of the waterbody type where each CWIS is located
b) identification & characterization of the source waterbody's hydrological & geomorphological features, as well as methods used and the results of any physical studies to determine the CWIS' area of influence
c) locational maps
d) *Facilities that withdraw cooling water from freshwater river or stream*: documentation showing the mean annual flow of the waterbody and any supporting documentation and engineering calculations that shows whether they are withdrawing less than or greater than 5 % of the mean annual flow. Representative historical data (from a period of time up to 10 years, if available) should be used to determine mean annual flow values.
e) *Facilities that withdraw cooling water from a lake (other than a Great Lake) or reservoir & increase the design intake flow*: a narrative description of the thermal stratification of the waterbody and supporting documentation & engineering calculations showing that the increased design intake flow will not disrupt the natural thermal stratification or turnover pattern of the source water in a way that adversely impacts fisheries.

3) Facility, Cooling System, and Cooling Water Intake Structure (CWIS) Information

Information will be needed to fully investigate the potential for organisms to become impinged on parts of the CWIS and/or entrained in the water circulated through the cooling water system. It will be necessary to describe the full range of potential physical, chemical, and biological impacts which could be encountered throughout the cooling system during a typical yearly operation cycle. The following are examples of information that may be needed to adequately describe the CWIS and cooling water system:

a) Site Location and Layout
   i) Map showing locations of all existing and proposed CWIS (from the permittee's facility and others in close proximity that may influence decisions related to the permittee's CWIS), associated cooling water systems, and other pertinent information related to surrounding shore and water features, including:
      (1) Latitude and longitude in degrees, minutes, and seconds for each CWIS;
      (2) Proximity of intake to effluent discharge(s), other permittees' discharges and water withdrawals
      (3) Proximity to areas of biological concern
   ii) Larger scale map w/topographic & hydrographic data depicting the location of the CWIS, including:
      (1) Topographic details, including existing site w/topographic features as changed by proposed CWIS
      (2) Hydrological features, including depth contours
      (3) Waterbody surface elevations (low and normal)

(4) Waterbody boundaries & affected waterbody segment
(5) Location and description of other CWIS in waterbody segment
(6) Additional stresses on waterbody segment (e.g., existing/planned point sources; etc.)

b) CWIS and Cooling System Descriptions
   i) A flow distribution and water balance diagram that includes all sources of water to the facility, recirculating flows, and discharges
   ii) A narrative description of the operation of each cooling water system, the relationship to each CWIS, proportion of the design intake flow used in the system, number of days of the year the system is in operation, and seasonal changes in operation
   iii) A description of CWIS operation; identification of withdrawal type (once-through vs. recycled); type of intake structure (size, shape, configuration, orientation); location of CWIS with respect to cooling water system; location in water body (horizontal and vertical); depth of intake; distance from shoreline; configuration including canals and channels; capacity (volume withdrawn in gpm & MGD; design & actual intake flows); timing, duration, frequency of withdrawal; presence/absence of organism protection technologies (behavioral and physical), fish bypass and handling facilities; average and maximum through-screen and approach velocities; proportion of water withdrawn to the overall source water flow
   iv) Design and engineering calculations and supporting data to support the descriptions mentioned above, including engineering drawings of proposed CWIS and cooling system
c) Use of Cooling Water System Biocides and Ice Removal Technologies
   i) Location of introduction in system
   ii) Description and aquatic toxicity information for biocide(s) to be used
   iii) Concentrations of biocide in various parts of cooling water system and receiving waters
   iv) Location, amount, timing, and duration of recirculation water for deicing or tempering
   v) Maintenance procedures, use of heat treatment or deicing procedures
d) Facility Data
   i) Age and expected lifetime
   ii) Capacity factor and percent of time at fractional loads
   iii) History of intake model

4) Impingement Mortality and/or Entrainment (IM&E) Characterization Study

The IM&E Characterization Study provides information to support the development of a calculation baseline and to characterize current and future potential for IM&E. In order to properly assess the potential for environmental impact from a CWIS, a one- to three-year biological survey would be preferable to establish the aquatic life present in the area. Unfortunately, the timelines specified by the federal rules do not allow the time for a thorough, multi-year survey of biological conditions (see page 5). In reality, a 1-yr study (spring 2005 - spring 2006) is probably all that will be possible, with some potential for additional data collection in the second year (summer 2006 - spring 2007) to verify trends or patterns noted in year one. In situations where an existing intake is being evaluated and relevant historical data is available which is representative of current conditions, historical data may be useful for helping to determine the relevance of more recent data.

Studies designed to collect biological information should be designed on a case-by-case basis, recognizing the uniqueness of biota-site-structure interrelationships. Surveys should be designed to determine the spatial and temporal variability of each of the important components of the biota that may be damaged by the intake. Local DNR fish biologists and water quality specialists should be consulted when selecting appropriate sampling methods and monitoring program design. The type and extent of biological and other data needed in each case will be determined by the potential severity of adverse environmental impact. Information for this element of the CDS is described at 40 CFR 125.95(b)(3). Since expected impacts will vary, each case is not expected to require the same level of study. A decision as to the timing and type of data necessary should be worked out during the PIC process. At a minimum, the study should include the following:

a) Taxonomic identification of all life stages of fish, shellfish, and any species protected under applicable Federal, State, or Tribal Law (including threatened or endangered species) in the vicinity of each existing and/or proposed CWIS

i) A list of species (or relevant taxa) for all life stages; their relative abundance in the vicinity of the CWIS;
ii) Identification of species & life stages most susceptible to IM&E. Species evaluated should include the forage base and those most important in terms of significance to commercial and recreational fisheries;
iii) Identification of all threatened, endangered, & other protected species that might be susceptible to IM&E

b) A characterization of the species noted above, including a description of the abundance, temporal, & spatial characteristics in the vicinity of each CWIS, based on sufficient data to characterize annual, seasonal, & daily variations in IM&E (related to climate/weather differences, spawning, feeding and water column migration)
i) Identification and evaluation of the primary period of reproduction, larval recruitment, and period of peak abundance for relevant taxa;
ii) Data representative of the seasonal and daily activities (e.g., feeding and water column migration) of biological organisms in the vicinity of the cooling water intake structure;
iii) Habitat preferences (e.g., depth, substrate)
iv) Principal spawning (breeding) ground; Migratory pathways; Nursery or feeding areas
v) Ability to detect and avoid currents; swimming speeds
vi) Body size; Age/developmental stage
vii) Physiological tolerances (e.g., temperature, dissolved oxygen)
viii) Feeding habits
ix) Reproductive strategy; Mode of egg and larval dispersal
x) Generation time
xi) Other functions critical during the life history

Supporting documentation should include a description of all methods and quality assurance procedures for sampling and data analysis including a description of the study area, identification of biological assemblages, and sampling and data analysis methods. The sampling and data analysis methods used should be appropriate for a quantitative survey and based on consideration of methods used in other biological studies performed within the same source water body.

Once the occurrence and relative abundance of various life stages of fish and shellfish have been estimated, it will be necessary to determine the potential for their involvement with the CWIS. Some organisms may spend a portion of their life in the pelagic phase and be susceptible to entrainment; migratory species may be around the CWIS for only short periods during the year; different species may be susceptible to effects during different life stages. Knowledge of the organism's life cycle and local water circulation patterns related to the structure are essential to estimating an individual species' potential for impacts due to the CWIS. Though not required by the federal rule, it may also be desirable to relate the estimated loss of individuals to effects on the whole population. The magnitude of the expected environmental impact could be estimated both in terms of short term and long term impact with reference to the following factors:

c) Documentation of the current IM&E of the species noted above and an estimate of IM&E to be used as the calculation baseline, including:
i) Absolute damage (# of organisms impinged or entrained on a monthly or yearly basis);
ii) Percent damage (% organisms impinged or entrained);
iii) Absolute and percent damage to any endangered species or otherwise critical aquatic organism;
iv) Absolute and percent damage to commercially valuable or sport fisheries;
v) Whether the impact might endanger the protection and propagation of a balanced population of fish and shellfish in and on the body of water from which the cooling water is withdrawn (long term impacts).

5) Technology and Compliance Assessment Information

Design and Construction Technology Plan. If the permittee has chosen to use design and construction technologies and/or operational measures, in whole or in part to meet BTA requirements, the permittee must submit a Design and Construction Technology Plan to the Department for review and approval, including design plans (e.g., design and engineer calculations and estimates) for the CWIS. The plan should explain the technologies and/or operational measures which are in place and/or which have been selected to meet the requirements. (See 40 CFR 125.95(b)(4)(i).)

Technology Installation and Operation Plan. This plan is one of the most important pieces of documentation for implementing the requirements of the rule. It serves to (1) guide facilities in the installation, operation, maintenance, monitoring, and adaptive management of selected design and construction technologies and/or operational measures; (2) provide a schedule and methodology for assessing success in meeting applicable performance standards; and (3) provide a basis for determining compliance with the rule requirements. If the permittee has chosen to use design and construction technologies and/or operational measures in whole or in part to comply with the applicable requirements, the permittee must submit the information specified at 40 CFR 125.95(b)(4)(ii) for review and approval by the Department.

6) Restoration Plan (optional)

Facilities may use restoration measures that produce and/or result in levels of fish and shellfish in the facility's waterbody or watershed that are substantially similar to those that would result through compliance with the applicable performance standards or alternative site-specific requirements. If the permittee proposes to use restoration measures, in whole or in part, to meet the applicable requirements, the permittee should submit the information required in 40 CFR 125.95(b)(5).

7) Information to Support a Site-specific Determination of BTA

According to EPA's Phase II rule, if the permittee requests a site-specific determination of BTA because of costs significantly greater than those considered for a similar facility in establishing the applicable performance standards, the permittee must provide certain information specified at 40 CFR 125.95(b)(6), depending on the site-specific determination requested.

8) Verification Monitoring Plan

This plan is the permittee's proposal for measuring the efficacy of the implemented design and construction technologies and/or operational measures. The plan should include at least two years of monitoring to verify the full-scale performance of the proposed or already implemented design and construction technologies and/or operational measures. Verification monitoring should begin once the technologies and/or operational measures are implemented and continue for a sufficient period of time (but at least two years) to assess success in reducing IM&E. Components of the Verification Monitoring Plan to be included in the permit are described at 40 CFR 125.95(b)(7).

How Do Staff Determine What Is "Best Technology Available"?

As discussed above, s. 316(b) requires, and Chapter 283.31(6), Wis. Stats., allows the Department to require that the location, design, construction, and capacity of a CWIS reflects the best technology available (BTA) for minimizing adverse environmental impact. In order to make decisions regarding whether a facility will meet these requirements, the Department will need to evaluate the CDS information submitted by the permittee.

- *Location*

  Intake location is an important factor influencing the potential for impingement, entrainment, and destruction of habitat. Careful site selection for a CWIS is the first line of defense in minimizing loss or damage to an aquatic population. Once the site is selected, one or a combination of technologies can be employed to further reduce losses due to IM&E. Since the distribution of aquatic organisms is seldom random, historical and recent biological data in the area of the CWIS should be reviewed carefully. The following are some criteria for consideration during the selection of an appropriate CWIS location:

  1. Generally, a CWIS shouldn't be located in spawning areas, nursery grounds, migratory routes, or river mouths, since these are areas where large concentrations of fish and shellfish are expected. Impacts to sensitive, threatened, and endangered species should be avoided. Historical and current field studies should clearly illustrate the biological

community present at the site. Survey results should be helpful when determining where intakes and intake pipelines should be built to minimize impacts to spawning, feeding, nursery, or migration areas, and to sensitive, threatened, and endangered species.

2. The CWIS should not serve as an attractant to immature or adult fish, either by physical alteration of the environment, by providing shelter, or by the influence of heated water (except where heated water is essential for maintenance reasons).

3. Withdrawal from various vertical depths in the water column should be investigated and attempts made to avoid the largest concentration of fish, eggs, and larvae (keeping in mind daily and seasonal variations).

4. Total design intake flows should not alter the natural stratification of the source water.

5. If a new CWIS is proposed, a Chapter 30, Stats., permit for placing a structure on the bed and/or removal of material from the waterway may be required. As part of that permitting process, a s. NR 347, Wis. Adm. Code, sampling plan for reviewing the presence/absence of contaminants that may be dredged, moved or disturbed as the intake structure and pipeline are constructed may also be required.

6. Navigation impacts should be evaluated. A minimum water depth should be maintained above the structure to avoid boats and other watercraft, where possible. (These issues will likely be evaluated at the time of Chapter 30 permit review, where appropriate.)

- *Design/Technology*

It is impossible to design any one type of structure that will minimize environmental impact in every situation. However, in general, most designs should incorporate some type of screening device that will guard against impingement losses. If entrainment is also a concern, screens with even smaller slots may be necessary. Regardless of screen mesh size, CWIS should be designed to minimize through-screen velocities. A maximum through-screen velocity of 0.5 fps is thought to be protective of most fish species. Additional intake designs that maximize survival of impinged fish may also be implemented. These designs either divert organisms away from the intake structure or collect impinged organisms, protect them from further damage, and return them to the source water. These include fish-handling systems such as fish buckets, fish troughs, fish baskets, fish pumps, fish elevators and spray wash systems. In order to decide which technologies are best suited to obtain BTA for a given site, staff will need to understand the range of technologies available that address entrainment and impingement.

Since the 1970s, industry groups have been investigating CWIS technologies, looking for ones that are both biologically- and cost-effective. This has led to the development of a variety of technologies that address different biological, environmental, and engineering concerns associated with different target species, waterbody types, and physical locations (onshore, offshore, in-river). Research continues on new technologies, as well as modifications to existing technologies. Descriptions and other information regarding the most commonly used CWIS technologies are contained in USEPA's "*Technical Development Document for the Final Regulations Addressing Cooling Water Intake Structures for New Facilities*" (http://www.epa.gov/waterscience/316b/technical/technicaldd.html, Chapter 5) and it's "*Technical Development Document for the Proposed Section 316(b) Phase II Existing Facilities Rule*" (http://www.epa.gov/ost/316b/devdoc/final.htm, Chapter 3) which also contain additional references on CWIS impacts.

- *Capacity*

One of the best ways to minimize the impacts of a CWIS is to reduce the rate and amount of the water that is withdrawn. This may only be an option for facilities with once through cooling and could come at the expense of an increase in temperature through the discharge. Both of these consequences should be considered prior to making final decisions on the intake rate and amount. Cooling water withdrawals that result in water loss or consumptive use (likely for all power plants) that will be > 2 MGD must comply with ch. NR 142, Wis. Adm. Code, *Water Resources Management and Conservation*.

Biological study results, restoration plans, and evaluations of site-specific technologies should be evaluated to determine if adverse impacts are occurring (or will occur). Some level of aquatic environmental impact is likely to occur whenever there is entrainment or impingement as a result of the operation of a CWIS. The critical question is the magnitude of those effects and the potential overall impact on aquatic populations and their habitat. Indirect impacts should also be considered, including: disruption of thermal regimes or normal water flow/circulation; wetland or other upland disturbance (especially during construction of a new CWIS); aesthetics; and noise.

Staff will need to review submitted information to confirm that existing or proposed measures will result in meeting the percent reductions required by the applicable performance standards. In the case of existing facilities, this may be accomplished through the use of reliable, quantitative estimates of IM&E that is occurring and projecting the long-range effect of such damage to the extent reasonably possible. In some cases, reliable estimates of future damage may be estimated through the use of historical data, pre-operational models, biological studies, and/or the operating experience of other facilities. However, historical data should be used carefully, and only in situations where source water and operating conditions have not changed significantly over time.

When a new CWIS is being proposed, biological studies may be needed to determine the abundance and distribution of aquatic organisms in the vicinity of the proposed CWIS. Data from these studies should be used to predict the potential for impingement, entrainment, and other impacts due to the location, design, construction, and capacity of the proposed CWIS. The losses of aquatic life at an existing CWIS can be determined in most cases through the direct measurement of numbers, sizes and weights of organisms impinged and entrained (taking into account daily and seasonal variation). Impingement monitoring usually involves sampling impingement screens or catchment areas, counting the impinged fish, and extrapolating the count to an annual basis. Entrainment monitoring typically involves intercepting a small portion of the intake flow at a selected location in the facility, collecting organisms by sieving the water sample through nets or other collection devices, counting the collected organisms, and extrapolating the counts to an annual basis.

Once potential involvement is determined, actual effects on organisms can be estimated. One hundred percent loss of individuals impinged should be assumed unless valid field or laboratory data are available to support a lower loss estimate. Section 316(b) performance standards do not allow for any predicted survival of entrained organisms, instead assuming that all organisms that are entrained are lost. The most commonly entrained life stages include eggs, larvae, and juveniles. Because of their small size, limited or no swimming ability, and highly vulnerable physiology, these life stages will most certainly experience high mortality rates as a result of entrainment. The presumption is that entrainment and passage through the cooling system will kill most if not all of these organisms. (For more discussion of IM&E performance standards, see page 3).

If the standards are met with the existing intake, then the permit should be reissued with appropriate monitoring requirements. If additional technology or operational controls are needed, such requirements should be incorporated into reissued permits together with appropriate monitoring requirements.

Monitoring Requirements in WPDES Permits

Once proposed technologies and/or restoration measures have been implemented, follow-up monitoring should be required in the WPDES permit in order to determine whether these measures are in fact meeting the performance standards. IM&E monitoring can usually be accomplished through direct measurement of the numbers, sizes and weights of organisms impinged and entrained (accounting for daily and seasonal variation).

In cases where a CWIS has been present for some time (without significant modification), and some monitoring has been done which demonstrates ongoing compliance, it may be acceptable to reduce the level of monitoring required in the WPDES permit from previous levels. However, where a new CWIS has been approved, or where significant changes in intake location, design, construction, capacity, or operation have taken place, a more vigorous monitoring program should be required to demonstrate that the CWIS is meeting BTA standards.

WPDES permit language should include monitoring requirements for permittees with approved CWIS' to demonstrate compliance with the appropriate standards. Monitoring programs should include measurements of impingement, entrainment, maximum through-screen velocity, and visual or remote inspections to insure that chosen technologies are operating as designed.

Frequently Asked Questions

The following questions related to 316(b) Phase 2 implementation were compiled at meetings between the Department and representatives of existing power plants who must comply with Phase II of the s. 316(b) rules. Questions 1-15 were sent to USEPA staff in Washington D.C., in the fall of 2004. The answers received from EPA are given in *italics* (referenced portions of the s. 316(b) Phase II rules can be found at http://www.epa.gov/ost/316b/). Please note that the "Director" is the state permitting authority (the WDNR). Questions 16-28 were presented to the DNR in January 2005. Department answers are given in *italics*.

1) **Do performance standards (for impingement mortality & entrainment) apply to fish and shellfish only?**

   The Phase II rule applies to fish and shellfish only. It does include all life stages of fish and shellfish (See section 125.93 [p. 41684] *for definition of impingement and entrainment).*

2) **Should actual flow or design flow be used when determining the calculation baseline? If actual flow, what is the averaging period? (Or should it be a maximum flow value?)**

   The Director has the discretion to determine which flow (actual or design) to use when determining the calculation baseline. See page 41617.

3) **What averaging period should be used when determining (or predicting) compliance with the performance standards? (Or should it be a maximum flow value?)**

   See page 41617, column 3. Director has discretion to set the timeframe.

4) **Is the WDNR going to allow "restoration measures" to obtain compliance with the performance standards?**

   Phase II regs do not preclude DNR from allowing the use of restoration measures. Though the regulations do allow the use of restoration measures (See page 41686), states can be more stringent (see page 41683, second column)

5) **Does the 316b rule apply to the entire facility (combining all CWIS) or does each structure have to meet the standards individually?**

   When determining compliance with performance standards the Phase II rule is silent on how that measurement would be made. However, the 25% cooling use criteria applies to the entire facility. The preamble discusses multiple intake structures in regard to calculating capacity utilization rate and evaluating the 5% mean annual flow against the total design intake flow on page 41636.

6) **If a facility has existing, older biological/316b type data, can it be used to demonstrate compliance with the new performance standards?**

   Historical data may be used to determine the calculation baseline. (see page 41617, column 3). Note the facility should provide an analysis that demonstrates whether conditions in the waterbody and at the facility are the same or similar to those conditions when the data were originally collected. The Director should determine if the data are representative and whether additional data should be collected.

7) **Is a May-September monitoring period sufficient in all cases, or are there species spawning in colder months in some areas?**

   See page 41619-20. The director has discretion to determine monitoring period. It is a site specific determination and would be determined based on life history of species in area of influence.

8) **When determining whether the Phase 2 standards apply to a facility, is the <50 MGD / >5% river flow values compared to actual or design flows? Maximum or average flows? What is the appropriate averaging period?**

The 50 MGD threshold is based on total design intake flow. See page 41683, column 2. The 5% river flow value is compared to the design flow. See page 41686, column 1.

9) **When determining whether the Phase 2 standards apply to a facility (i.e., >5% river flow), which river flow value is used? (e.g., Q7,10? Actual flow?)**

Mean annual flow should be used.

10) **Can a facility restrict their flows to get below the 50 MGD and/or 5% river flow cutoffs in order to "drop out" of Phase 2? (or is it not possible to get out of the Phase 2 group once you are in?)**

See page 41610-11. The 50 MGD threshold is based on design intake flow. If a facility meets each of the criteria in section 125.91(a) [see p. 41683]*, it is subject to the Phase II rule.*

11) **What will EPA's (region 5 and/or HQ) role be in the BTA determination process?**

EPA or States, if without authorized NPDES program, will participate in the process as outlined in the NPDES regulations. The permitting authority will be the major player in the BTA determination process.

12) **What is "significantly different" for the cost/cost & cost/benefit analysis?**

Rule is silent on how to define "significantly different".

13) **What are other states doing?**

EPA is putting together a 316(b) contact list and will be starting up a private listserver for States.

14) **Are there concerns about (special requirements needed for) CWIS in close proximity to one another?**

See page 41589. The preamble discuss EPA's concerns regarding CWIS in close proximity.

15) **Will the Department consider extending the deadline for submittal of Comprehensive Demonstration Studies beyond the three and one-half years described in the rule?**

(NOTE: Utility staff said they'd seen a schedule from another state which allowed this deadline to extend beyond 3 1/2 years. Their understanding was that this was done in the interest of balancing workload for the facilities and for state staff purposes, since without an extension everyone will need to be out in the field during the spring/summer of '05. It appears to be the general consensus that a 2nd year of monitoring is going to be needed to ensure that Year 1 is representative, since ultimate compliance will be based on existing conditions vs. modified conditions. A hard deadline of January '08 for CDS submittal and the need for confirmation monitoring the summer of '07 would not leave adequate time to evaluate data and determine appropriate enhancements/design changes needed to get a facility into compliance.)

Our interpretation of the Phase II regulations requires CDS no later than January 7, 2008 for existing permits that expire before July 9, 2008. (see page 41687).

Please note responses given above [to questions 1-15] *have not been reviewed by Agency management and therefore are not official Agency's position. These are staff's opinion to your questions/issues.*

- Jennifer Chan
US EPA, Washington D.C., Water Permits Division, Industrial Branch
phone: 202-564-0995; fax: 202-564-6431
(email response received Thursday, October 07, 2004)

16) What will the relationship between DNR and Region 5 EPA be (relative to 316(b) implementation) and what role each will play in this process?

As stated in question #11 above, implementation and enforcement of the 316(b) rules and BTA decisions are the responsibility of the NPDES permitting authority. In Wisconsin, the WPDES program is delegated to the DNR. Region 5 EPA staff (and, in some cases, maybe those at headquarters in Washington D.C.) will be kept apprised of the progress in each situation, and may provide input and advice when needed.

17) Who are the appropriate DNR contacts for follow up questions, PIC submittal, availability for individual discussion?

As noted on page 4 of this guidance, permit drafters in the Bureau of Watershed Management's WW Permits & Pretreatment Section will be the primary contact for all Phase II activities. All discussions, meetings, plans and reports should be coordinated through this person, in order to insure that the Department has one point of contact who is aware of all aspects of the project. Copies of all PIC and CDS plans and reports should be sent to these staff, who then will be responsible for seeing that other DNR staff receive copies, as appropriate.

18) What is the DNR's view of [application information submittal timeline] extension requests for CDS submittal to January 2008?

As discussed on page 5 of this guidance, the federal rule allows existing facilities with permits that expire before July 7, 2008, to request an extension no longer than January 7, 2008, for submission of application materials. With the exception of a few facilities that may have already completed a substantial portion of the CDS requirements, the DNR will likely grant the maximum time extension for CDS information submittals, in order to allow sufficient time for data collection and analysis. Requests for timeline extensions should be sent to the WW Permits & Pretreatment Section permit drafter assigned to the facility.

19) How involved does DNR want to be in the development of PIC/CDS plans? Does DNR wish to be consulted prior to the actual submittal of the PIC?

Due to the limited timeline allowed by the federal rule, and the fact that a large number of facilities will be submitting plans and reports on the same timeline, it is unlikely that Department staff will have enough time to fully review and give input on draft PICs. However, specific PIC-related questions (emails, phone calls, etc.) should be directed to the WW Permits & Pretreatment Section permit drafter assigned to the facility. Frequent communication between the permittee and Department during CDS study development will be important; it is recommended that regular meetings and conversations occur throughout the process to ensure that all agree as to the scope and details of work planned and completed.

20) Does DNR expect to approve PICs prior to implementation or simply review and comment?

Department staff should review and comment on these plans.

21) Should biological surveys focus only on representative species of concern or identify and count all fish/fish life stages?

The Department and Utilities should work cooperatively to compile a list of representative and important fish and shellfish species that should be identified during the CDS process at each location. Each list will likely be site-specific. A starting point for these lists may be taken from previous 316(a) and (b) studies and other biological surveys in the area of concern. Regional fisheries staff should also be consulted for identification of important species of concern in the study area.

22) How should a nuisance species be addressed in baseline and compliance calculations?

Nuisance species (non-native, invasive species, etc.) that the permittee feels should not be included in IM&E and other evaluations should be identified and discussed with DNR staff during the PIC process.

23) What is the DNR's opinion regarding the appropriateness of companies combining resources to perform joint studies?

The DNR has no objection to companies working cooperatively to collect information, as long as the information is representative and used appropriately for each facility's situation.

24) Are there any specific fish protection technologies the DNR views with particular favor or disfavor?

Not at this time.

25) Would taking an enforceable permit limitation that limits flow to something less than full capacity qualify as an impingement/entrainment reduction strategy to the degree that the flow reduction limitation is below maximum capacity?

Only a permanent structural change in the cooling water system (e.g., pump or pipe capacity, restrictor plates, etc.) that restricts flow below threshold values is acceptable.

26) Would reduction in design capacity (e.g., pump replacement) by some modification to < 50 MGD remove a facility from Phase 2?

The federal rules specify that Phase II applies to a facility whose design intake flow is ≥ 50 MGD. If a facility can take permanent, physical steps to change it's design intake flow to < 50 MGD, then phase II would no longer apply to that facility. It should be noted, however, that facilities with a design intake flow < 50 MGD may still be subject to permit conditions implementing 316(b) set by the DNR on a case-by-case basis, using best professional judgment.

27) Does DNR consider achieving an 80% impingement and 60% entrainment reduction as fully meeting the standards or do they have a different interpretation as to how the 80-95/60-90% range will be applied?

The federal rule allows a reduction ranging from 80-95% impingement mortality and 60-90% entrainment (where applicable) to meet the BTA standard. Reductions of 80% impingement and 60% entrainment would meet these standards, although it would not allow much room for safety. Averaging periods for determining percent reductions and compliance with the BTA standards should be chosen and agreed to during the PIC/CDS process.

28) Discussion of cost-cost and cost-benefit in terms of what constitutes "significantly greater than."

"Significantly greater than" and the applicability of the cost-cost and cost-benefit options will likely have to be determined on a case-by-case basis.

Additional Guidance On Cooling Water Intake Structures And Related Topics

- WDNR site - http://dnr.wi.gov/org/es/science/energy/oe.htm
- Public Service Commission of Wisconsin - http://psc.wi.gov/
- Electric Power Research Institute - http://www.epri.com/
- EPA website - http://www.epa.gov/ost/316(b)/

APPENDIX 1:
Statutory Timelines and Agency Responsibilities for Approval of New Power Plants

(see also documents #212 & 213, in EGAD: Electronic Guidance and Access Directory)

The Public Service Commission (PSC) and the Department are both involved in making regulatory decisions regarding several categories of energy-related projects, including new electric-generating facilities. The PSC and DNR are also responsible for complying with the Wisconsin Environmental Policy Act (WEPA) and the Power Plant Siting Law (s. 196.491(3), Wis. Stats.). The Power Plant Siting Law establishes a tight schedule for review of proposed power plant projects.

The formal process begins with the DNR's review of an "Engineering Plan" to identify the regulatory requirements for the facility, which must be submitted at least 60 days before the filing of an application with the PSC. The Department's review of the Engineering Plan must be completed within 30 days of it's receipt. The applicant then has 20 days to submit applications for the permits identified during the review of the Engineering Plan and the Department has another 30 days to determine if those applications are complete. In making the application completeness determination, the Department also considers whether it has enough information to do an adequate WEPA review (including an environmental impact statement or environmental assessment) and shares those conclusions with the PSC. Once the Department finds the applications to be complete, it has 120 days to make regulatory decisions for the permits or approvals necessary for construction of the facility to begin.

The applicant must also file an application for a Certificate of Public Convenience and Necessity (CPCN) with the PSC. The PSC then has only 180 days from finding that an application is complete to make a final determination on whether to approve the project. If the PSC does not make its determination within the statutory time frame, the CPCN is automatically granted. Within this time frame, the PSC (generally with the Department as a cooperating agency) must complete the WEPA process, hold a public hearing on the CPCN application, make a decision at an open meeting, and draft an order for final approval at a future open meeting.

FIGURE 1. SCHEDULE OF STATUTORY EVENTS FOR REVIEWING POWER PLANTS
(S. 196.491, WIS. STATS.)

Day 0 – Engineering Plan received by DNR
Day 30 – DNR response to Engineering Plan regarding permits and approvals required
Day 50 – Project proponent submits applications for DNR permits
Day 60 – Project proponent submits CPCN application to PSC
Day 80 – DNR makes determination of application(s) completeness
Day 90 – PSC makes determination of CPCN application completeness
(DNR and PSC review permit applications, prepare WEPA document, hold public hearings)
Day 200 – DNR makes decisions on permits needed for construction of the facility
Day 270 – PSC makes decision on CPCN
Day 271 – Construction of power plant facilities may commence

The rapid, statutorily required schedule described above puts considerable pressure on the Department to accelerate the review of proposed power generation facilities and complete activities necessary to issue the appropriate permits, when appropriate. In order to insure that strict timelines are met and all needed information is gathered and assessed appropriately, the Department usually assigns a team of staff to review each power plant project, including someone responsible for the review of CWIS submittals and requirements.

The Department's new Office of Energy is assigned responsibility for overseeing the overall implementation of new power plant project review procedures and for coordinating the review of Engineering Plans for proposed power plants. For each project, a "Project Manager" may be appointed from either the central office or region, a case-by-case basis. The affected Region will designate a Regional Coordinator for the project (may be the same as the "Project Manager" if that person is in the Region). The Project Manager and Regional Coordinator are charged with establishing and maintaining effective communication between (and within) the Department, the PSC, and all affected outside parties. (Additional information regarding the Department's Office of Energy is available at: http://dnr.wi.gov/org/es/science/energy/oe.htm)

APPENDIX 2
PIC/CDS Plans & Reports: Examples

PROPOSAL FOR INFORMATION COLLECTION
PHASE II RIVER FACILITIES

1. Review 40 CFR Parts 9, 122 et al,. to determine which sections of the Rule pertains to your facility.

2. Research archives and data sets to determine the extent of existing historical 316 (b) information available:
    - impingement characterization
    - impingement mortality
    - entrainment characterization
    - source water population studies
    - source water hydrologic data
    - past agency correspondence

3. Review Section 300 Questionnaires (industry survey done by EPA to collect information related to 316(b)) for accuracy and completeness. (Attach questionnaire or summarize in PIC.)
    - approach velocity
    - through screen velocity
    - screen mesh size
    - CWIS pump calculations

4. List current credits to impingement/entrainment reductions:
    - Intake location and design
    - Existing technology installed
    - Operational measures
    - Existing restoration or stewardship projects
5. List proposed technologies or restoration plans to be evaluated to achieve compliance:
    - Restoration plan proposal
    - Proposed cost benefit analysis
    - Operational changes
    - Installed technology
    - Proposed technology test plans

6. Develop sampling plan to assess current baseline/validate historical study results (include QA/QC procedures).
    - Representative Species
    - Moribund species issues
    - Sampling frequency
    - Mortality sampling protocol

7. Submit draft plan and supporting documentation for State review.

8. Meet with appropriate agencies to finalize plan.

9. Set schedule to begin data collection.

PROPOSAL FOR INFORMATION COLLECTION
PHASE II -GREAT LAKES FACILITIES

1. Review 40 CFR Parts 9, 122 et al,. to determine which sections of the Rule pertains to your facility.

2. Research archives and data sets to determine the extent of existing historical 316 (b) information available:
   - impingement characterization
   - impingement mortality
   - entrainment characterization
   - Great Lakes fish population monitoring work (GLFC, USFWS ,"gray" literature)
   - Historic state & federal agency correspondence
     1. 316 (b)-related
     2. WPDES permit-related

3. Review Section 300 Questionnaires (industry survey done by EPA to collect information related to 316(b)) for accuracy and completeness. (Attach questionnaire or summarize in PIC.)
   - approach velocity calculations / actual measurements
   - through-screen velocity calculations
   - screen mesh size
   - screen operations
   - CWIS flow calculations

4. List current credits to impingement / entrainment reductions:
   - Intake location, capacity and design; note changes since initial studies which may be used for establishing baseline conditions
   - Fish protection technologies in place
   - Operational measures adopted
     1. seasonal flow reductions
     2. traveling water screen operations
   - Existing restoration or stewardship projects

5. Proposed technologies or restoration plans to be evaluated to achieve IM & E compliance:
   - Impingement mortality reduction strategies
     1. Technologies
     2. Operational changes
     3. Restoration plans
   - Entrainment reduction strategies
     1. Technologies
     2. Operational changes
     3. Restoration plans
   - Proposed cost analyses - IM & E strategies
   - Proposed benefit evaluations - IM & E strategies
   - Evaluate EPA's site specific cost estimates

6. Develop sampling plan to assess current baseline/validate historical study results (include QA/QC procedures).
   - In-plant and in-lake sampling programs
   - Procedures to deal with dead / diseased individuals
   - Sampling frequencies (impingement & entrainment)
   - Mortality study protocols (optional)

7. Submit draft plans and supporting documentation for State review.

8. Meet with appropriate agencies to finalize plan.

9. Set schedule to begin data collection.

The following format is recommended for Comprehensive Demonstration Study (CDS) reports and other information provided to support a finding that the cooling water intake represents best technology available. Three copies of all CDS plans and reports should be submitted to the Permit Coordinator in the Bureau of Watershed Management's WW Permits and Pretreatment Section, who is assigned to the facility. This person will then be responsible for insuring that other DNR staff (CWIS Coordinator, Basin Engineer, fisheries experts, endangered resources specialists, etc.) receive copies, as appropriate for the given project.

1. Title page (facility name, waterbody name, company, permit information, etc.).
2. Table of contents.
3. An executive summary of 2-3 paragraphs (essence of material and conclusions).
4. Detailed presentation of methods used in data collection, analysis and/or interpretation.
5. Supportive reports, documents, and raw data.
6. Bibliographic citations to page number of cited text.
7. An interpretive, comprehensive narrative summary of all studies done to support a finding that the CWIS represents best technology available. Sources of data used in the summary should be cited to page number. The summary should include a clear discussion stating why the report shows (or does not show) that the CWIS in question minimizes impact on the water resources and aquatic biota in the vicinity of the intake and throughout the waterbody segment.
8. An appendix listing the companies and consultants who conducted the work used in the report.

PIC and CDS Plans and Reports should be mailed to WW Permits & Pretreatment staff at:

Department of Natural Resources
Bureau of Watershed Management
101 S. Webster Street
PO Box 7921
Madison, WI 53707-7921